Soil Conservation

February 1979

U.S. Department of Agriculture

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Working Together for Wildlife

From the Administrator

This month marks the 50th anniversary of the Migratory Bird Conservation Act. The act established a Migratory Bird Conservation Commission to review and approve proposals for the purchase or rental of areas under the act.

Waterfowl sanctuaries on public lands under this act are the nucleus of the national waterfowl conservation effort—but they can't do the job alone. These areas safeguard existing populations of migratory birds and reduce crop depredation. Nationwide, waterfowl habitat acquired under the Migratory Bird Conservation Act amounts to 10 million acres. State-controlled waterfowl habitat areas make up another 5.1 million acres.

However, a major part of the Nation's waterfowl habitat must continue to be provided on private land, usually in close association with agriculture.

Wetlands in private ownership provide valuable wintering, migrating, and breeding habitat for waterfowl. They also provide habitat for many other species of fish and wildlife.

In fiscal year 1977 alone, landowners in soil and water conservation districts managed more than 600,000 acres of wetlands for wildlife habitat.

USDA is striving to improve its ability to help these landowners blend food and fiber production needs with wildlife needs.

One way is by more carefully inventorying where wetlands are and identifying the options available for use and management. Last summer, SCS had a series of meetings with the U.S. Department of the Interior's Fish and Wildlife Service to improve the compatibility of our prime farmland studies and their inventory of wetlands of the Nation. This is part of an SCS effort to to aid the Fish and Wildlife Service with the use of soils information in a new national wetland inventory.

Another way is through the Water Bank Act. The water bank program offers a significant alternative to outright acquisition for the protection of migratory bird habitat. It also provides economic incentives for private landowners to maintain and manage wildlife.

In this golden anniversary of the Migratory Bird Conservation Act, let us continue to provide landowners and project sponsors with practical suggestions and alternatives for maintaining or improving fish and wildlife habitat.

To be successful, habitat management must be integrated with other conservation work.

Mel Davis

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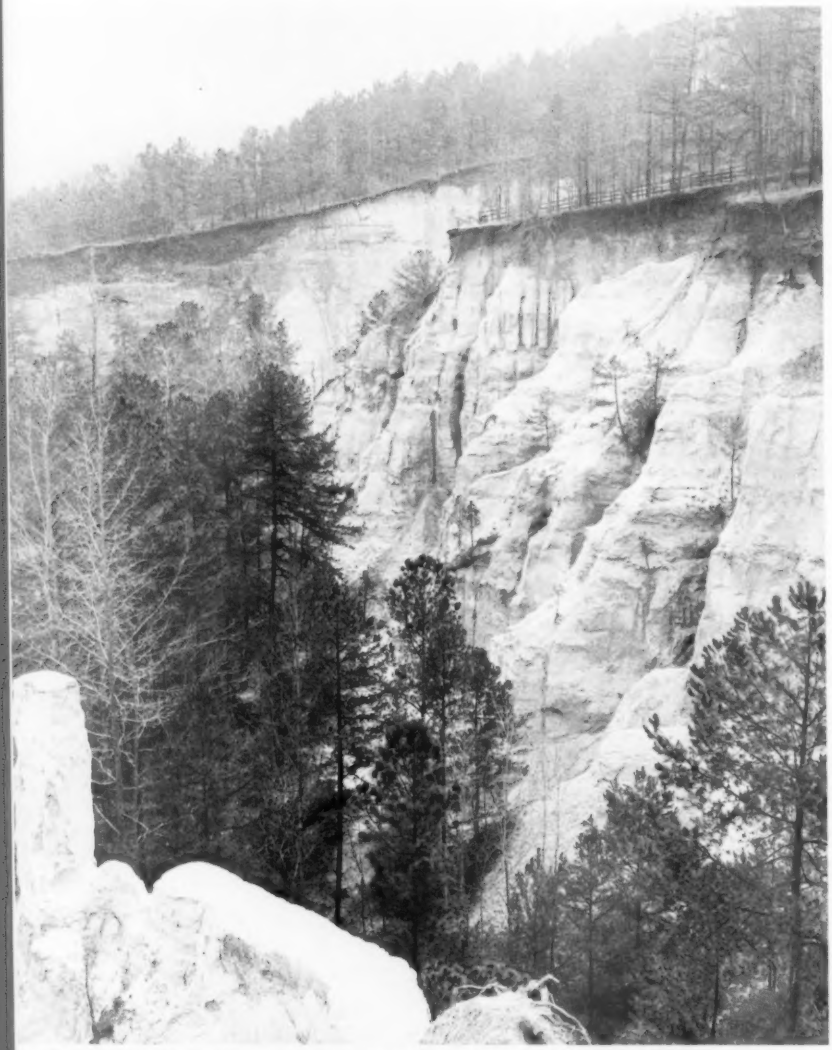
Cover:

- **Front—Severe flood damage from heavy rains in southern California last year left scenes such as this golf course near Anaheim. What is now a stream channel was the center of a fairway before floodwaters carried it away.**
- **Back—Another scene of devastation in southern California was this house in Ventura County. Before the flooding, the house sat 25 feet from the riverbank. Part of the house was torn away by floodwaters and carried downstream. See article beginning on page 7. (Photos, Donald C. Schuhart.)**

The Canyons Are Alive

by Frank M. Blackburn

Trees and soil undermined by erosion crash into the depths of Providence Canyons in Georgia. Diversions are helping slow the process.



Dramatic geologic formations can be viewed by visitors to Providence Canyons State Park. Water running down the highly erosive second layer, or Providence Formation, forms rills in the canyon walls. Sometimes the water will cut off a column of the Providence sands, isolating it from the wall (left).

Providence Canyons in southwestern Georgia have been called caves, gullies, and even a gulping monster.

The canyons lie in a rough, broken part of Stewart County where steep ridges rise to an elevation of 200 feet or more above the deeper stream bottoms. The gullied area covers about 150,000 acres. The gullies vary in width from a few feet to 400 feet or more and they vary in depth from 150 to 200 feet.

There are several theories on how the canyons formed. Some say the water dripping from the eaves of a barn started the erosion process, and some say it was a spring in the area that started it. Another theory is that settlers followed well-established Indian and animal trails and used them for roads, eventually wearing them down so much that it triggered the massive erosion that formed Providence Canyons.

Although these factors may have all contributed somewhat to the formation of the canyons, the main factor was the manner of use of the land by the settlers who built their homes in the red clay hills and cleared the land of its heavy growth of hickory, oak, and shortleaf pines to plant cotton. They set the stage for the creation of an unparalleled example of accelerated soil erosion.

On a cold morning after a heavy freeze or frost, Providence Canyons seem to be alive. As the frost and ice melt, the soil thrust from the canyon walls is released and drops to the canyon floor. It sounds much like sleet falling. The face of the canyons changes almost daily.

Three geological formations in the

canyons have been exposed by the erosion. The top layer is known as the Clayton Formation and is made up of sands and clays that eroded from the piedmont and northern parts of the State and were subsequently redeposited. The reddish clayton layer averages 15 feet thick but is as much as 25- to 30-feet thick in some places.

Underneath the top layer is the Providence Formation which is approximately 125 feet thick. This formation is made up of highly erosive chalky-white sands. Under the sand is the Ripley Formation. It is a gray clay and is highly resistant to erosion. Now that the canyons have eroded down to this formation, it is unlikely that they will get much deeper.

But erosion is still taking place at the head of the canyons and laterally along its sides. The lateral erosion is caused by water coming down the face of the tough upper Clayton Formation and eroding the underlying erosive Providence sands. This leaves the sandy-clay clayton material suspended and it eventually caves off and crashes to the canyon floor carrying trees and brush with it.

During the days of the Civilian Conservation Corps (CCC), many acres of land in and around the canyons were planted to trees. Eroded hillsides and gullies were planted to kudzu.

In 1971, with funds allocated by Stewart County, the State of Georgia, and the U.S. Department of the Interior's Bureau of Outdoor Recreation (now the Heritage Conservation and Recreation Service), 1,108 acres of the canyons area was purchased to be developed into a State park.

The following year the Georgia Department of Natural Resources and a planning firm asked the Lower Chattahoochee River Soil and Water Conservation District to provide an inventory and evaluation of the soil conditions in Providence Canyons.

Jerry Pilkenton, a soil scientist with the Soil Conservation Service, made a soil survey of Providence Canyons. Areas of 11 different kinds of soils were outlined on a map of the park and described. For each of the areas, eight land uses were evaluated: ponds and reservoirs, septic tank filter fields, roads and streets, fill material for roads, campgrounds, picnic areas, playgrounds, and paths and trails.

The soil map, soil descriptions, interpretations, and other information were provided to the Georgia Department of Natural Resources for use in planning the park.

Providence Canyons State Park has an information center where visitors can view pictures of the common vegetation of the area which includes rare plants such as the plum leaf azalea. The information center also has monoliths illustrating the kinds of soil around the canyons. The Park staff is available to answer visitors' questions on the botanical and geological aspects of the canyons.

The most dramatic canyons cover 200 acres of the park, and around their rim, 8,000 feet of fenced trails have been installed. Twenty well-placed lookout points provide visitors an excellent view of the vast canyons. Picnic tables with grills, one picnic shelter, and comfort stations are also available to park visitors. Currently, the park is open only during the day.

Diversions have been installed to safely carry water away from the canyon walls. They are generally seeded with an adapted grass such as common bermudagrass or 'Pensacola' bahiagrass. Short diversions near areas of heavy foot traffic are generally planted to periwinkle. Although the diversions are not able to stop erosion completely at the canyons, they are able to slow it down.

One primary concern of managers of the park area is maintenance of existing vegetation. Areas of stately pines planted by the CCC still stand in the park today.

Cement check dams, also from the days of the CCC, can be seen on a stroll through the park.

Since its opening, Providence Canyons State Park has gone from attracting a few hundred visitors to more than 120,000 visitors annually. The influx of visitors is having a favorable effect on the local economy.

Mr. Blackburn is district conservationist, SCS, Lumpkin, Ga.

The 3-Week Inferno

by Crystal A. Williams

When record storms hit California last year, flood control officials carefully watched the storms' effect on four major watersheds in Monterey County. Only 6 months earlier, the State's second largest fire had ravaged 178,000 acres of Monterey wilderness and other forest land.

What residents called the Marble Cone Fire—in 21 days of burning—had left the land charred and barren, and had raised the specter of a flood disaster that could cause up to $75 million damage.

As the 1978 storms receded, government officials and local property owners were pleasantly surprised. Flood damage to the four watersheds was minor.

Tree skeletons are the stark remains of 21 days of burning. The fire left the land vulnerable to further damage by flooding.

Credited with helping avoid serious disaster was an interagency restoration effort that began as soon as the ground cooled in August 1977. The following month, watershed residents and representatives from 29 government agencies met to review a comprehensive damage report and determine what should be done.

Proposed was a variety of emergency work including seeding, debris removal, clearing and snagging along channels, and installation of an early flood warning system. The watershed restoration work would be carried out under the Flood Control Act of 1950's Section 216, administered by USDA's Soil Conservation Service.

A few days later, USDA's Forest Service and other agencies began planned measures in the four burned watersheds—Big Sur, Little Sur, Carmel, and Arroyo Seco. Almost $2 million was spent to clear 145 miles of channel, seed 156,000 acres by air, and hand-seed 160 miles of fire suppression lines to annual ryegrass.

By the end of November, there were only a few jobs left to be done. But winter rains came, and nothing could be done except wait out the bad weather.

When the heaviest storms subsided in March 1978, only minor damage was reported on the treated watersheds. "The clearing work done right after the fire prevented any extensive storm damage," said Gene Ares, SCS district conservationist at Salinas. "Potential floodwaters stayed within the channels."

Aerial seeding in the watersheds was nearly 65 percent effective, according to Robert Hammond, Forest Service district resource manager. "Seed didn't take in some areas because of strong winds, but other areas looked like pastures with a solid stand of chest-high grass."

A recent California Department of Fish and Game (CDFG) survey shows that it will be a decade before fisheries return to their prefire condition, and that deer, birds, and small forest wildlife are beginning to move back into areas with water supplies.

Throughout the restoration process, CDFG officials worked closely with other agencies to minimize adverse impact of stream channel work.

Local reaction to the emergency work has been positive, according to Gary Koeppel, member of the Big Sur Coordinating Committee, a citizen group that helped with the project.

Dusan Petrovic, chairperson of the Monterey County Board of Supervisors, agreed. "The restoration work was undertaken with a minimum of red tape or delay," he said. "And best of all, it prevented the catastrophic flood damage we feared might happen after the fire."

Ms. Williams is a public information specialist, SCS, Davis, Calif., and presently a graduate student in radio and television broadcasting.

Rainfall turned into deluge and Californians had to move quickly to restore damaged watersheds.

by Judith E. Ladd

After the rain

A natural gas pipeline, which had been buried, hangs above a channel torn out by raging floodwaters.

Previously buried irrigation pipes were left hanging after floodwaters carved a 100-foot chasm through an avocado orchard in Ventura County.

When a grill at the top of a protected water chute became blocked by debris, stormwater cut a new path, exposing a gas line and eroding the bank.

When the rain began to fall in Southern California in early February last year, area residents breathed sighs of relief. At last they could see an end to the 2-year drought.

Their relief turned to alarm, however, as the rain continued day after day. For 6 weeks, southern California was battered by storms. And when the rain ended in mid-March, the area had received more than three times its normal rainfall.

The damage was widespread and devastating. Normally slow-moving streams became raging rivers, carrying along everything in their paths—trees, soil, and boulders. The storms left waterways clogged with silt and debris, caused landslides, eroded and undercut streambanks, and severely damaged flood control structures. The storms affected homeowners, farmers, ranchers, and city dwellers alike.

Duffy Lewis, a homeowner who lives beside Pickens Creek in La Crescenta, 20 miles northeast of Los Angeles, said he lost 8,400 square feet of his backyard.

"One night when the rains started getting heavy, I went outside with a five-cell flashlight to see how high the water had risen in the creek," said Lewis. "I was just about to step over a little foot-high chain fence in my backyard when I shined the flashlight down and saw the water rushing by right in front of me. If I had stepped over that chain, I would have been gone.

"I've never seen or heard anything like it," he continued. "Two people standing next to each other in my backyard couldn't have heard one another over the roar of the water.

"Boulders came crashing down with the water, banging against the sides of the canyon. The furniture in my house and my neighbor's across the street jumped from the force just as if an earthquake had hit."

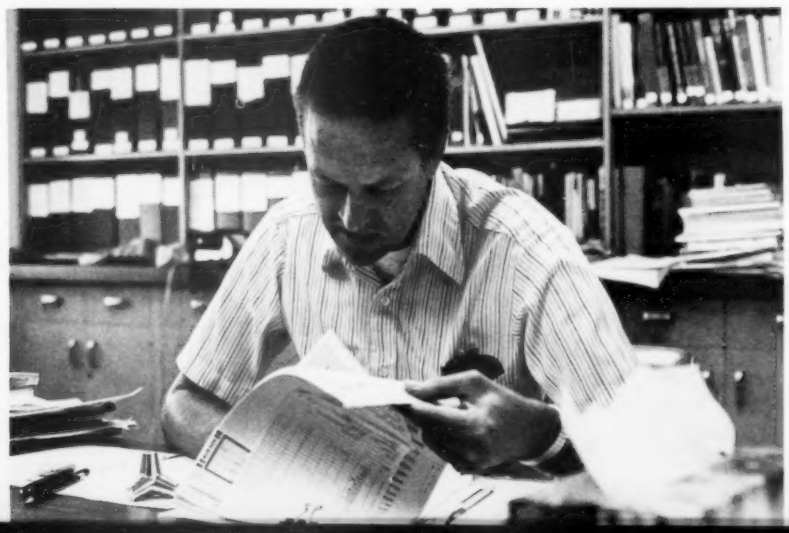
South of Los Angeles near Escondido, heavy stormwater in Moosa Creek cut a new channel for about 200 feet and washed out half the road it used to flow under. About 25 ranches and homes in the area were affected by flooding.

During the storms the channel of the Salinas River in Monterey County widened 50 feet or more, eating away at $5,000-an-acre land along its banks where high-value crops are grown.

A golf course near Anaheim in Orange County now has a river running through what used to be a fairway.

In Riverside, a soaked hillside slid down onto houses below, snapping them in half and filling them with mud and debris.

Similar scenes took place in county after county—until nearly 15 million people were affected in the 70,000-square-mile area. President Carter declared southern California a major disaster area, making emer-



James Stubchaer, head of the flood control district in Santa Barbara County, reflects on the magnitude of the job to be done. Last year's flood disaster in southern California was the second worst in the State—topped only by the destructive storms of 1969 when 33 counties were declared disaster areas.

gency funds and assistance available to 13 counties.

The Federal Disaster Assistance Administration (FDAA) and the State Office of Emergency Services coordinated initial emergency programs to relocate people who had lost homes and to save property from rising waters. From the beginning of the heavy storms, local flood control districts worked around the clock fighting floods that seemed unending.

An emergency center was set up in the Federal courthouse in Los Angeles. The center housed temporary offices for FDAA, the Soil Conservation Service, the U.S. Department of Housing and Urban Development, and other Federal and State agencies.

Once people were quickly mobilized and organized, Federal emergency work began in full force. Flood control districts, the U.S. Army Corps of Engineers, SCS, and other agencies, surveyed damaged areas. As the surveys were made, a damage survey report (DSR) was prepared for each site investigated. Each DSR described the damage and recommendations for repairs along with an estimate for the cost of repairs.

DSR's then were reviewed to determine various agency responsibilities and to assure that sites posing an immediate danger to life or property were repaired quickly.

Based on the damage surveys, about $52 million would be needed for emergency watershed work under Section 216 of Public Law 81–516, the Flood Control Act of 1950. The task ahead was enormous for SCS, which administers the emergency watershed program, providing technical and financial assistance. Nearly 350 projects were involved and included:

- Restoring 420 miles of stream and river channels.
- Revegetating 18,000 acres of denuded land.
- Cleaning out 57 debris basins.
- Repairing 1,200 miles of National Forest roads.
- Repairing 21 miles of levees and dikes.

"The objective of emergency watershed protection is to safeguard lives and property from future flooding and the products of erosion," noted Pat Burke, SCS district conservationist for San Diego County. "We are concerned with restoring damaged areas to the condition they were in just before the storm."

SCS responsibilities in the 13-county area include providing cover for land stripped of topsoil, opening channels clogged by debris and sediment, shaping and stabilizing streambanks that were cut away during the floods, cleaning debris basins, and repairing or replacing channel stabilization structures.

It was obvious that the job was a big one, the largest emergency undertaking in agency history. SCS

In Riverside County, homes built at the base of a highly erosive cliff were "remodeled" during the storms when the cliff slipped downhill and squeezed kitchens into living rooms.

people from throughout California were brought into the area to help in the disaster counties and to staff the temporary Los Angeles office, which soon was dubbed "LA Central."

"It was quickly apparent that we didn't have enough SCS people in the State to handle the work, and we began calling on other SCS State offices for help," said Francis Lum, SCS State conservationist for California. "We especially needed additional people who were experts in engineering, contracting, and construction inspection."

So far more than a dozen States have sent volunteers on details of 6 weeks or longer. Included are SCS employees from Hawaii, Montana, Nevada, New Mexico, New York, Oklahoma, South Dakota, Utah, Washington, Wisconsin, and Wyoming, as well as SCS's West Technical Service Center.

"They've also come from Idaho and Pennsylvania . . . people whose experience dealing with the Teton Dam and Johnstown Flood restoration work has proved valuable in helping get the job done in California," Lum said.

The out-of-State volunteers join either the LA Central staff or one of the county teams, according to LA Central project manager Jack George. "County teams are made up of engineers, conservationists, and technicians who help plan the repair projects, then oversee their construction. Because of their close working relationships with people in the communities involved, SCS district conservationists were selected as the county team leaders."

The LA Central operation also is conducted on a team approach. "We have people working here in a wide variety of jobs, such as agronomists, biologists, hydrologists, resource conservationists, engineers, public information specialists, administrative specialists, and landscape specialists," explained Herman Cohen, assistant project manager at LA Central. "Coordination between sponsors, county teams, and LA Central is eased by management and liaison teams."

After early decisions were made regarding eligibility of each of the 350 projects, management teams and team leaders sat down with flood control district leaders to determine design and construction schedules for local projects. Local sponsoring officials also set priorities for completion of each project in the county.

County governments agreed to assign more than 175 people to help carry out the emergency program. Local agencies provided design engineers, drafting specialists, and construction inspectors. One Los Angeles County employee, Civil Engineer Michael Oliver, joined the LA Central staff as a contract specialist from September until the office was closed in December.

Receding floodwaters near Escondido left their mark: silt deposited on irrigated pastureland.

Soon after the storms were over, restoration work began. Crews cleaned debris from a canyon northeast of Los Angeles to protect the watershed from future flooding.

Before design, an environmental assessment was prepared for each project. Projects then were designed to minimize potential adverse impact on the environment.

Where wetlands or endangered animal species were involved, USDI's Fish and Wildlife Service was consulted. The Corps of Engineers reviewed projects in all counties to determine whether permits were required for work in channels.

Rights-of-way and access permits to do the needed onsite work had to be obtained, as well as permits from the California Department of Fish and Game, and if the project was located in the coastal zone, permits from the California Coastal Zone Commission.

"Plans for any work in coastal areas has to go before the Coastal Zone Commission, including plans for disposal of sediment cleared from channels," explained James Stubchaer, head of the flood control district in Santa Barbara County.

"Time for all of these requirements needs to be included when scheduling even emergency projects."

Since many of the projects involved the need for revegetation, county teams worked with local resource conservation districts to develop land treatment plans for emergency watershed work.

As each project was developed, plans, landrights, permits, and other supporting documentation were sent by county teams to LA Central. After plans were reviewed and accepted, the LA Central staff developed a bid proposal, sent out notifications to contractors, scheduled site showings, accepted bids, and awarded contracts.

"The awarding of the contract doesn't mean the end of work for us," noted District Conservationist Don Hansen, team leader for Santa Barbara County. "Either an SCS or a flood control district inspector must be onsite during construction

SCS District Conservationist Don Hansen inspects a 3-foot-high concrete wall built to stabilize the toe of the streambank. Water rushing around a bend in the stream undercut the base of the original structure.

Miles of sediment-choked channel in San Diego County required cleaning before rains brought the threat of additional flooding.

to see that the project is done according to plan. The project also has to have final inspection and be approved before the contractor is paid the balance of the money."

While the work had its complexities, the magnitude of the program was considered its greatest challenge by Californians involved in the emergency effort. "It's really something to be thrown into a program of this size," Stubchaer said. "Facing this much critical work—and the need to get it done quickly—requires an exceptional amount of effort and cooperation."

By the end of December, nearly 500 contractors had been contacted to do the restoration work. More than 100—including some from as far away as Pennsylvania and Oklahoma—had been awarded contracts to carry out projects that ranged from $10,000 to $1.7 million.

There was an urgency to the effort—a race against time and weather. The most critical work had to be done before winter rains arrived and brought with them the prospect of more extensive damage to California watersheds.

In the 3 months following release of funds provided by Congress for the $52 million program, over two-thirds of the projects had been designed and more than half the projects either were completed or under construction.

Californians credit a strong cooperative effort by local, State, and Federal agencies for making the massive, complex restoration task successful. Watersheds are being restored, hillsides covered, channels cleared, and people and their property protected.

Ms. Ladd is editor, *Soil Conservation*, SCS, Washington, D.C.

Banks along the Salinas River in Monterey County are stabilized by tying together wire baskets filled with rock. Afterwards, the rock and wire are covered with soil and planted to erosion-control shrubs.

Save Our Streams—

Adopt One

"Defenders of soil, woods, waters, air, and wildlife" is the motto of the Izaak Walton League of America.

by Shirley Foster Fields

Our Nation's streams are important water supply sources for agricultural, municipal, and industrial uses. They also offer recreational opportunities such as fishing, swimming, and boating. These are two of the many reasons the Izaak Walton League has developed a program to "save our streams."

Some people love streams as they love children. And when they do, they adopt one.

"Save Our Streams (SOS)—Adopt One" is a national citizen action program originated by the Izaak Walton League of America. In 29 States, troubled waters are becoming clearer streams thanks to the work of citizens who place high value on a restored environment. And the number of "adopting parents" is increasing.

People who adopt a stream are encouraged to know every characteristic of that stream through onsite, firsthand experience. The "Ikes"—members of the Izaak Walton League—call this their "hands-on" policy. In summer and winter, in sunny and rainy weather, they walk the banks and wade in the waters of their adopted streams. By sight, sound, smell, and touch they observe and evaluate: water quality, soils, the presence or absence of wildlife, streambank vegetation, urban encroachment, and numerous other environmental factors.

As they work, they ask themselves: Is this stream healthy or sick? If the answer is "sick," their quest may eventually bring about the stream's healing.

It is not necessary for an SOS stream adopter to be a professional scientist or technician. Factors that influence the life and death of a stream are diversified, but many are easily identified and understood by ordinary people.

No special knowledge is required to perceive the difference between streams clogged with sediment and fish-killing algae, and streams that run fast and clean—uncontaminated by pollutants that accompany soil erosion.

Untrained eyes can detect sewage outfalls and the effects of eroding streambanks, toxic runoff from agricultural chemicals and improperly managed animal wastes, refuse dumps, and manmade and natural stream barriers.

Stream parents carefully note these and other conditions—stream size, streambank habitat, and watershed environs, for example—on an SOS stream survey form. The stream survey is not a document that satisfies the exacting requirements of hydrologists, limnologists, or agricultural engineers. But if a stream is ailing, it defines the apparent cause of the ailment in clear but general terms.

SOS county "coordinators" receive the surveys and distribute them among local and State environmental and water quality authorities. Professional environmentalists may then be assigned to inspect polluted streams, and recommend conservation measures that will bring about a cure.

At this point, it is the ordinary citizen who once more carries the ball. The Ikes call for volunteer conservation workers, and citizens respond.

At 288 Save Our Stream projects, thousands of unpaid volunteers are working with technical experts to restore the environmental integrity of America's streams, lakes, and rivers. Individuals and groups that answer the SOS call represent civic, social, business, church, and government organizations.

The stream-healing tasks performed by the SOS volunteers are diverse. If litter is a problem, the SOS team organizes cleanup days with the help of local Scout troops, adult conservation clubs, church groups, or high school ecology clubs. If wildlife habitat will be destroyed by proposed urban development, the point is emphasized at public hearings on rezoning or approval of construction permits. If sediment exceeds acceptable limits, upstream farmers or ranchers are apprised of no-cost technical assistance available from USDA's Soil Conservation Service and their local soil conservation district in installing conservation practices that reduce soil erosion.

Roy Overton of Des Moines, Iowa, is a practicing physician whose healing art reaches well beyond the city's hospitals, his patients' homes, and the doors of his office. He is a general practitioner for people—and no less a general practitioner for streams.

Iowa State chairperson of Save Our Streams and a board member of the Des Moines Chapter of the Izaak Walton League, Overton spearheaded an effort to restore litter-strewn Walnut Creek.

On the outskirts of Des Moines, in suburban Urbandale, the creek meanders from northwest to southeast through the Urbandale shopping center. It then flows directly into the Raccoon River, the source of drinking water for Des Moines' citizens.

The portion of the creek that flows through the shopping center is only two city blocks long. It is hemmed in

on both sides by enormous concrete and asphalt parking lots. A pizza restaurant is located near the creek's east bank, and to the west there is a large department store. The two parking lots, joined by bridges that span the stream, accommodate 1,800 cars a day and at least double that number of shoppers. This, then, was the setting for SOS action and the rescue of the stream.

Why the rescue?

Three years ago, this stretch of flowing water was the victim of almost every insult that can befall a city stream. All manner of refuse—newspapers, beer cans, paper plates and napkins, plastic eating utensils—blew off the parking lot and littered the banks of the stream. Ragged clods of soil were eroding from its banks, and its waters were a junkyard of mud-covered shopping carts and the twisted, rusting bodies of abandoned cars.

"Those shoppers ran back and forth from the pizza parlor to the department store to the parking lot," Overton said. "They ran and they looked, but they never did see. They didn't see the redwing blackbird in the bushes beside the creek. They had forgotten how important it is to develop an awareness of beauty within themselves."

And so Overton decided to help the citizens of Des Moines sharpen this inner awareness. He signed the Ike's official SOS adoption papers, and assumed full responsibility for the healing and continued well-being of Walnut Creek.

Overton first launched an attack on litter. He called League members for help, then contacted newspaper

Roy Overton (in dark shirt) called on fellow "Ikes" to help clean up Walnut Creek. The Ikes had to remove litter and debris such as abandoned cars and shopping carts. They also asked SCS for help in controlling streambank erosion.

editors and radio and television reporters to announce the creek's coming transformation.

Forty people—all Ikes—answered Overton's call to action. From the parking lots and the bridges, hundreds of people watched the stream's rescue. It was a celebration, an all-media event. The owner of the pizza parlor donated pizzas and beer. Television cameras whirred. Radio announcers wandered about interviewing onlookers. Newspaper reporters took notes.

"First we had to get rid of the abandoned cars," Overton recalled. "We were lucky. We found a man with a crane at a nearby construction job. At no charge, he dragged the cars out of the creek, and we hauled them to a landfill 15 miles out of town.

"Then we removed the shopping carts. There were 20, some so deeply buried in mud that we had to drag them out with ropes attached to a truck. Ten were salvageable, so we repaired them and sold them for $50 apiece. We used part of that money to buy a picnic table and trash cans that we placed near the edge of the stream."

Streambank erosion was a problem that required expert help. The Ikes called the Polk County Soil Conservation District. The district asked SCS District Conservationist Bill Mills to examine the site. Mills recommended abundant plantings of crownvetch and honeysuckle down to the water's edge.

Mills supervised while the Ikes did the digging and the planting. Today, the two plants, thanks to their thick root systems, are keeping soil on the streambank and out of the creek. This, in turn, reduces sediment in drinking water downstream.

"Why do I think the adoption of this little scrip-scrap of a city stream is important?" Overton asked. "Certainly water pollution is a massive problem nationwide. So, what real difference does Walnut Creek make?"

The physician answered his own question: "People at the shopping center stopped rushing for awhile. They paused and they looked. They saw what we did. And it caused some to realize that out of indifference or ignorance, *people* pollute this Nation's streams and people can make them clean."

Although Walnut Creek has been healed, Overton's work is not done. With characteristic fervor, he and his fellow Ikes have adopted a larger, rural stream—Beaver Creek, northwest of Des Moines. This time the enemy is far more pernicious than litter. It is nonpoint source water pollution.

Beaver Creek, Overton explained, is typical of Iowa's rural streams, and that is why he chose it for study. It drains some 800 acres of prime agricultural land, "just about the finest quality farmland for crops and livestock found anywhere in Iowa."

But whether it is high quality or poor, agricultural land can hold the residues of insecticides, herbicides, nitrogenous fertilizers, and animal wastes, and slowly yield these to rivers and streams through soil erosion. The amount of pollutants in the stream at the point of entry may be harmless and so small as to defy detection. But when washed downstream with sediment, these nonpoint source pollutants can become concentrated enough to kill fish and create hazards to human health.

For an hour or two every Sunday, no matter what the weather or the season, Overton either walks the banks or floats on a rubber raft taking water samples from Beaver Creek. He regularly sends his water samples to a laboratory for pollution analysis, and his discoveries are neither cheering nor surprising.

"The water shows high levels of coliform bacteria. These bacteria live mainly in the digestive tracts of warm-blooded animals and indicate contamination by human and animal wastes," Overton explained. "In themselves, they are not harmful. They are indicators. Their presence shows that conditions in the stream are favorable for the existence and growth of organisms that cause such diseases as dysentery, cholera, hepatitis, and typhoid fever."

There is no doubt that the muddy waters of Beaver Creek carry several or all of these pathogenic organisms. Why, then, have there been no recent outbreaks of the diseases? Perhaps, Overton speculated, it is largely a matter of luck. No one has been foolish enough to swim in the creek's polluted waters and no one has accidentally fallen in.

"But some day some youngster may take a dare from a friend and deliberately dive in," Overton said.

The Ikes are not waiting for that day to come. In their own way, they are stirring the waters of public opinion to hasten every possible effort—statewide and nationwide—to make America's streams clean.

Every year, the Des Moines Ikes set aside $4,000 for a scholarship fund at Iowa's Drake University. The scholarship is awarded to a student of limnology, the study of freshwater streams, ponds, and lakes.

"Limnologists are rare and valuable people," Overton explained. "They aren't easy to find, and we need many of them. Right now we are paying the tuition of an especially gifted student who has made a 1-year study of Beaver Creek.

"Neither his studies nor mine have resulted in great or startling scientific discoveries. And we didn't expect that. What we do hope is that our work will dramatize the need for better management of livestock wastes on Iowa farms and on all American farms, and better soil conservation practices everywhere to reduce erosion and runoff."

Overton and the Ikes nationwide are well aware of Public Law 92–500 —the Federal Water Pollution Control Act Amendments of 1972—that calls for the restoration and maintenance of the "chemical, physical, and biological integrity of the Nation's waters by 1983."

They are aware, also, of Section 208 of the act and of Iowa Senator John C. Culver's amendment authorizing cost-share funds to rural landowners for soil and water conservation measures that will reduce nonpoint water pollution. They are observing with keen interest the cooperative work of the Soil Conservation Service, soil conservation districts, the Environmental Protection Agency, and State and areawide 208 agencies in getting the Rural Clean Water Program underway.

Overton (left) adopted Beaver Creek, northwest of Des Moines. He periodically takes water samples from the creek and has them analyzed for pollution.

At their July 1978 annual convention in French Lick, Ind., the Ikes adopted a resolution on the Rural Clean Water Program that states, in part: "Sediment, fertilizers, pesticides, and animal wastes in agricultural runoff are major polluters of the Nation's waters. They form a substantial part of nonpoint pollution, which, as a whole, is responsible for about 50 percent of our water pollution. Nonpoint sources of pollution are so serious that failure to control them will prevent achievement of the Federal Water Pollution Control Act's goal of 'fishable, swimmable waters by 1983' even if all point source discharges are cleaned up."

Overton was at the Ike's conventon. He stated: "Only now as a Nation are we beginning to see very clearly how much easier it is to foul our waters than to clean them. Can we afford to ignore the evidence any longer?"

The Ikes have at least one solution to the problem: "Save Our Streams —Adopt One."

Ms. Fields is a public information officer, Information Division, SCS, Washington, D.C.

And the Winners Are . . .

Terry Joe Shaw
NACD Teacher of the Year
First Place

by Thomas W. Levermann

"Learning about the environment and the proper stewardship of our natural resources is not only fascinating, but also an essential part of an adequate education.

"In a nonthreatening, supportive atmosphere, students can reach beyond themselves and become physically and mentally involved in the whole environment."

This is the philosophy of a winner: Terry Joe Shaw, the 1978 recipient of the National Association of Conservation Districts (NACD)—Allis-Chalmers Conservation Education Teacher-of-the-Year Award.

The primary goal of Shaw's program at the Stillwater Middle School in Oklahoma is instilling in students a sense of responsibility for stewardship of our natural resources. He tries to help each of his sixth grade students develop the feeling that "What I do makes a difference."

Shaw uses real-life situations to help students become more aware of how values can conflict with each other. For instance, students may say they would like to own off-road vehicles but that they are also concerned about declining wildlife habitat. To help them make a decision, he shows them how to consider and critically analyze both wildlife habitat needs and the rights and responsibilities of owning off-road vehicles. Shaw feels that this and similar exercises will help students make wise decisions in the future about managing the environment.

Shaw bases his environmental conservation education program on six major criteria: student involvement, ethical behavior in relation to the environment, educational activities that apply to real-life situations, motivation, open-endedness, and problem-solving skills. Shaw tries to meet as many of the criteria as possible in the activities he designs.

After completing the land-use unit, one sixth grader asked his contractor uncle, who was having trouble with cracked driveways and foundations, "Did you check the shrink-swell potential of your soils?" Thus, as a spinoff of education, an important conservation consideration was passed on to another person.

Throughout the school year, many of Shaw's activities are held in the school's outdoor classroom, which the students developed themselves. Each activity is geared to sharpening skills such as measuring, observing, classifying, and communicating. To give students a broad perception of the environment, Shaw incorporates science, mathematics, language arts, social studies, art, and physical education into his environmental conservation education program.

Near right, Terry Joe Shaw shows a student how to use a wind meter. His students use various scientific testing techniques to study environmental relationships. Far right, Shaw's sixth grade class had several entries in an annual environmental education poster contest. One of his students won first place.

Shaw also organized and developed a program called "Adventures Beyond the Classroom," a 2-day outing for sixth graders. Students investigate various environmental relationships; learn about soil types and their characteristics; take part in map reading, arts and crafts, and sensory awareness activities; and write poetry and stories.

A favorite of the students is the land use planning activity developed by the Soil Conservation Service, and supplemented by resource materials from other agencies and organizations. Students devise the best land use plan for 1 square mile just outside town. They must consider how soil types; flood plains; availability of roads, water, electricity, and sewer; and other factors influence land use.

The Payne County Conservation District, Oklahoma State University, and many people from the community have provided valuable assistance to Shaw and his "Adventures Beyond the Classroom" program.

Terry Joe Shaw wants his students to have the skills and knowledge to make intelligent resource decisions and to develop an appreciation for the order and beauty of nature. "When this is accomplished," said Shaw, "each student will have developed a conservation ethic, which will translate into a personal commitment to be wise stewards of our natural resources."

Mr. Levermann is an educational relations specialist, Information Division, SCS, Washington, D.C.

John Dolson NACD Teacher of the Year Second Place

by Kay Mergen

John Dolson, science teacher at Bill Reed Junior High School in Loveland, Colo., credits "good team work" for the success of the environmental education program that won him second place in the NACD—Allis-Chalmers Conservation Education Teacher-of-the-Year awards program.

Jim Weyand, principal at Reed School, while recognizing the contributions of students, teachers, and many other people in the community, credits Dolson with the energy and leadership that moved the program out of the planning stage and into action.

With the cooperation of Jeanne Bolton, chairperson of the science department, and five other science teachers, Dolson organized the school's environmental education program as a 3-year unit for seventh, eighth, and ninth grade students.

Seventh graders at Reed study soil, water, plant needs, classification of plants and animals, population, and energy. Part of their introduction to the environment is the annual "Outdoor Experience," a series of backpacking trips to nearby wilderness and primitive areas in groups of 40 students and 4 teachers. More than 100 teachers and 2,500 students have participated in these outings which combine environmental studies with planning the details of the trip—food, shelter, and safety.

When students move into the eighth grade, they continue studying the environment, investigating such things as the measurement of matter, chemical reactions, energy sources, and pollution. Environmental projects on the school site and outdoor resource studies are also part of the eighth grade program.

John Dolson (left) and two of his science department colleagues work together to plan the annual Outdoor Environmental Experience for students and teachers.

In the ninth grade, students begin to translate their learning experiences into community action. They often meet with city and county officials to discuss local environmental issues.

Throughout the 3-year program, students suggest projects, recommend changes, and help plan studies which especially interest them.

Dolson explained that the educational objectives for the junior high unit are "producing a well-rounded citizen who fully understands the complexity of environmental problems. Students analyze projects, make decisions, and accept responsibility for their completion and evaluation."

Since the junior high program has been underway, enrollment in optional ninth grade science courses has increased markedly as students decide to follow up on various environmental interests.

Dolson has received a Federal grant for developing energy studies. In one energy project, ninth graders investigated heat loss in winter from several houses in relation to the cost of insulation, weatherstripping, and sealing windows. The students drew up specifications for the work and installed energy saving improvements in several homes belonging to elderly residents and families on fixed incomes.

The students' second energy project was designing and building a solar-powered greenhouse on the school site. Reed Junior High classes now study soils and food plants in the greenhouse. Local engineers and construction workers review and evaluate all designs and specifications for building projects done by the students and inspect the projects after they are completed.

A group of ninth graders is working this year to repair damage done to the Larimer County Fairground by the 1976 Big Thompson flood. With help from Soil Conservation Service personnel, soil investigations were made and appropriate grasses selected for revegetating the area.

In preparing for the project, students also studied watershed management, weather patterns, economic and human costs of the disaster, and the consequences of leaving the land unprotected. The Big Thompson Soil Conservation District helped provide technical assistance in preparing the soil and contributed $50 for the purchase of grass seed.

Increasingly, environmental education objectives and learning projects developed at Reed are being adapted to other junior high programs in the school district.

Not long ago, the Loveland League of Women Voters asked Dolson and his students to set up a recycling center for waste paper collected in the community. The class is looking into a market for using the paper to make cellulose insulation to help people save energy.

It doesn't seem likely that John Dolson and his junior high school students, colleagues, and community friends will run out of action projects.

Ms. Mergen is head of educational relations, Information Division, SCS, Washington, D.C.

Soil investigations are basic to the ecological studies program for seventh graders at Reed Junior High School where John Dolson has developed a comprehensive three-unit program in environmental studies for seventh, eighth, and ninth grades.

New Publications

The Reclamation of Disturbed Arid Lands

by the American Association for the Advancement of Science (A.A.A.S.)

In February 1977, in Denver, Colo., the Committee on Desert and Arid Zones Research of the Southwestern and Rocky Mountain Division of A.A.A.S. sponsored a symposium on recent and current research on the reclamation of mined land in the arid United States. "The Reclamation of Disturbed Arid Lands" is a collection of presentations made at the symposium.

The 11 presentations are organized under three main topics: an overview of research, reclamation studies at the Argonne National Laboratory in Illinois, and reclamation research in arid regions. The term "arid" is used to mean areas with mean moisture deficiency.

The presentations in the first section deal mainly with research on the feasibility of and methods for restoring the ecological balance in arid lands disturbed by mining. They cover research in revegetating mine spoils and the need for more long-range studies of the success of revegetation efforts.

The second section tells about studies made at the Argonne National Laboratory on the effect mining has on water quality in Western States, the economics of reclaiming mined land and land use planning, and the socioeconomic impacts of coal development in the West.

The presentations in the third section tell about potentials and predictions concerning reclamation of semiarid mined lands, plants and treatment for revegetation of disturbed sites in the intermountain area, how endocellular fungi improve shrub growth and survival on mine spoils, the effects of New Mexico humate deposits on restoration of mine spoils, and some applications of hydrologic simulation models for design of surface mine topography.

Maps, tables, charts, diagrams, graphs, and photographs illustrate the publication. A list of references follows most of the presentations.

Single copies are available from the University of New Mexico Press, Albuquerque, N. Mex. 87131. Single copies are $4.95.

Meetings:

February	
11–15	Society for Range Management, Casper, Wyo.
13–14	Southern Forest Institute, Inc., Houston, Tex.
13–16	Air Pollution Control Association, Gainesville, Fla.
13–17	Association of Interpretive Naturalists, Inc., Bloomington, Minn.
14–17	American Association of School Administrators, New Orleans, La.
14–17	Land Improvement Contractors of America, Nashville, Tenn.
19–24	American Camping Association, Minneapolis, Minn.
27–Mar. 1	American Society of Agricultural Engineers Domestic Water Quality Symposium, St. Louis, Mo.
March	
3–7	Association for Supervisors and Curriculum Development, Detroit, Mich.
3–8	American Society of Planning Officials, Miami, Fla.
14–16	Hardwood Manufacturers Association, Washington, D.C.
18–20	American Pulpwood Association, Atlanta, Ga.
18–23	The American Society of Photogrammetry, Washington, D.C.
23–25	National Wildlife Federation, Toronto, Ontario, Canada
24–28	North American Wildlife and Natural Resources Conference, Toronto, Ontario, Canada
April	
1–6	American Concrete Pipe Association, San Antonio, Tex.
4–6	Engineering Geology and Soils Engineering Symposium, Moscow, Idaho
22–25	Association of American Geographers, Philadelphia, Pa.

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